# FURTHER NOTES ON LEISHMAN'S BODIES

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# FURTHER NOTES ON LEISHMAN'S BODIES.

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I hope that the interest which must always attach to the discovery of new parasites of man will suffice to excuse me for adding yet another paper on this subject to those already contributed by Leishman,[1] Donovan,[2] Laveran,[3] and myself,[4] I have continued making a very close study of the three preparations so kindly lent to me by Donovan and referred to in my last paper, and now send, at the suggestion of the editor, some pen and ink drawings, and some additional remarks. It will be understood that the deep red of the Romanowsky-stained chromatin of the bodies is represented by black in the drawings, and that Fig. 1 denotes a red corpuscle introduced for comparison. Water-colour drawings by Donovan and by myself will shortly appear in the Thompson Yates *Reports*.

Fig. 1.—*Leishmania donovani*, Laveran; 1, red corpuscle; 2-6, free forms; 7-17, embedded forms; *a*, contour line; *b*, macronucleus; *c*, micronucleus; *d*, matrix.

It seems to me very important to note that in the preparations made *intra vitam* Leishman's bodies appear under two distinct conditions, namely, (*a*) free, and (*b*) embedded, to the number of one up to twelve, in a matrix. Figs. 2 to 6 illustrate the free forms. In the majority the contour is elliptic, but it is occasionally nearly circular. It is necessary to recognize that the contour line is a strong one, suggestive of a well-marked cell wall (that is, in the *intra-vitam* specimens, which are, of course, the most suitable for study). The two chromatin masses are generally situated at the extremities of the minor diameter of the elliptic cell (Figs. 2 to 5). The larger mass often seems to bulge beyond the cell wall (Figs. 2 to 4). I think that both masses are always present, but that the smaller one may be occasionally hidden by the larger. In my specimens the protoplasm of the cell is a faint red (without tinge of blue), and becomes fainter from the contour inwards, so that there is the characteristic clear area round the macronucleus. In short, all the free forms have a most definite size and structure.

Much interest, however, attaches to those bodies which are embedded in a matrix (Figs. 7 to 17). These are found only in the preparations made *intra vitam*, and are much less numerous than the free forms. Moreover the contour of the little cell is generally much less distinct in the embedded organisms than in the free ones; although the chromatin is stained just as deeply and the two chromatin masses bear just the same relations to each other as regards position and distance. What I call (until a more definite term can be employed) the matrix is always stained very faintly in these specimens—much more faintly than the red or white corpuscles. The tint is violet, or more rarely mauve. The structure appears cloudy, or perhaps granular, or even stromatic; but is too delicate for expression in the drawings. The form is generally a more or less regular oval (Figs. 8 to 16); but sometimes the mass appears to be shapeless or torn (Figs. 7 to 17). The outline is sharp; but it is important to note that there is never any contour line suggestive of a cell-wall, as with the Leishman bodies themselves. There is never, also, any suggestion of the haemoglobin of the red corpuscles, or the nucleus of the white corpuscles, to be seen in this matrix. Its size varies in my specimens from about 3 $\mu$ to 8 $\mu$ in the long diameter; and there is a rough, but only a rough, correspondence between the size of the matrix and the number of Leishman bodies it contains. Sometimes, as in Fig. 13, a considerable part of the matrix is empty; and sometimes, a rather large matrix holds only one of the bodies. Fig. 17 shows eight bodies in one matrix: but I have seen as many as twelve. Occasionally we find clusters of the bodies touching each other, without lying in any visible matrix; but in such cases their oval contours are well marked. One or more of the micronuclei are sometimes not to be seen. I should add that Donovan clearly shows, in his letter and drawings sent to me, that he has well observed all these forms.

In his recent paper[5] Leishman still inclines to the view that these bodies are "altered trypanosomes." In that case it is singular that in two whole specimens made during life and containing large numbers of them, we should not find a single unaltered trypanosome, or even the flagellum of one. I may be wrong, but I can see little in these objects to recall the involution forms of trypanosomes.

Since my previous paper[4] was dispatched (October 23rd, see British Medical Journal, p. 1359) Dr. Laveran, to whom also Captain Donovan has sent specimens, read an interesting paper on the subject.[3] He admits that the bodies are parasites; but thinks they are neither trypanosomes nor haematozoa (malaria group), and judges that they belong to the Texas cattle-fever group, *Piroplasma*. According to him the bodies are often contained in the red corpuscles, and are sometimes piriform. There is little evidence of this in the preparations sent to me; I have examined some thousands of the bodies, and have seen only two or three lying in contact with the red corpuscles (which are well preserved in two of the specimens). I am therefore inclined to attribute the contact only to accidental superposition. Nor have I observed any distinctly piriform bodies in my preparations. The matrix of the embedded forms does not present to me any of the characters of a red corpuscle altered by parasitic infection.

On the whole then, I think these bodies belong to a new genus of *Sporozoa;* and it seems to me, so far as I can judge from my specimens, that the individual bodies are spores produced in the matrices, which would appear to be relics of the parent organism.

Laveran has given the name *Piroplasma donovani* to these organisms; and the specific name must therefore be permanently adopted. But if, as I suppose, they are found to belong to a new genus, it would be only fair to give the name *Leishmania* to that genus. In that event the [illegible] name would be *Leishmania donovani*, Laveran.

I must present my profound apologies to Major Leishman for having overlooked the fact, clearly indicated in his first paper, that he had found these bodies as long ago as 1900.

References.

1 Leishman, British Medical Journal, 1903, vol i, p. 1252, and p. 1376. 2 Donovan, ibid, vol. ii, p. 79. 3 Laveran, *Bull. Acad. de Méd.*, November 3rd, 1903. 4 Ross, British Medical Journal, 1903, vol. ii, p. 1261.

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